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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/214,708	01/11/1999	MITSUSHI ITANO	XI/P6217USO	8306

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EXAMINER	
PERRIN, JOSEPH L	

ART UNIT	PAPER NUMBER
1746	

DATE MAILED: 03/08/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/214,708	ITANO, MITSUSHI	
	Examiner	Art Unit	
	Joseph L. Perrin, Ph.D.	1746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-22* is/are pending in the application.

4a) Of the above claim(s) *11-14, 16-17 & 21-22* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15 and 18-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. In view of applicant's amendment filed 29 December 2004, the status of the application is as follows:

Specification Objection

The corrected title has been approved by the Examiner.

35 U.S.C. §103(a) Rejections over Gabric in view of Yanagida or Sony Corp.

The rejection of claims 15 & 18-20 is maintained for reasons set forth below.

In response to applicant's argument that the C_3F_6 gas of Yanagida is an etching gas and not the C_3F_6 cleaning gas of applicant's invention, this is not persuasive because the gases are the same composition and would have the same properties. That is, the terms "etching" and "cleaning" do not change the composition of the identical gases. Applicant has failed to provide any evidence of how the compositions themselves differ. Moreover, etching is a species of the cleaning genus. The semiconductor art is replete with teachings that etching is a form of cleaning including the cited prior art reference of GABRIC (*see* col. 1, lines 6-7: "[t]he present invention relates to a method of cleaning by plasma etching." (emphasis added)). Further, GABRIC discloses cleaning the chamber by etching (*see* col. 1, lines 59-62).

In response to applicant's argument that YANAGIDA teaches away (pointing to column 2, lines 50-59) this is not persuasive because YANAGIDA teaches etching gases, for instance C_3F_6, in the removal of silicon oxides due to the higher etch rate of C_3F_6 and reduced amount of etching gas required as a result of the dissociation of the unsaturated bond to form two or more units of CF_x+ from one molecule of the etching gas (column 2, lines 1-4 & lines 40-55), and specifically for superior characteristics such as "high etchrate, high selectivity, low damage, and particularly low pollution" (column 3, lines 20-24). Even if, *arguendo*, one were to construe YANAGIDA as teaching away, it has been held that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

In response to applicant's argument that SONY teaches away pointing to column 3, lines 17-19, this is not persuasive because SONY teaches that it is known in the dry etching semiconductor art that unsaturated gases with the basic formula of C_xF_y, where x=2 or more, and y=2x or less, (and preferably $CF_3CF=CF_2$), are preferred due to the higher etching rate by dissociation of the unsaturated bond (col. 7, line 46 and the abstract). Even if, *arguendo*, one were to construe SONY as teaching away, it has been held that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock,*

Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

Therefore, both YANAGIDA and SONY teach that it is known to use C_3F_6 as an etching/cleaning gas due to the high dissociation as a result of the breaking of the double bond which thereby produces a higher etch rate. It is noted that applicant also uses C_3F_6 to achieve a quicker cleaning rate (*see* page 3, lines 11-17). One of ordinary skill in the art at the time the invention was made would recognize the advantages of using unsaturated fluorocarbon gas (*i.e.* C_3F_6 as disclosed by YANAGIDA and SONY and claimed by applicant) compared to saturated fluorocarbon gas (*i.e.* CF_4, C_2F_6, C_3F_8) as an etchant gas for improving the etching (cleaning) rate resulting in quicker cleaning.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 15, 18, 19 & 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,281,302 to Gabric *et al.* (hereinafter "Gabric", previously cited) in view of US 5,445,712 to Yanagida or JP 04-346428 to Sony Corp. (previously cited).

Gabric discloses a chamber cleaning method by treating a plasma CVD chamber of a semiconductor integrated circuit production device under chamber cleaning conditions using a plasma formed by the gas mixture of at least one fluorinated carbon, such as CF_4 and C_2F_6, and oxygen (O_2) (column 2, lines 3-5

& 27-44), thereby removing byproducts such as silicon and oxides and nitrides of silicon (column 1, lines 8-11; column 1, line 59 – column 2, line 2; column 2, lines 29-33; column 3, lines 5-7).

Although Gabric does broadly disclose the use of "at least one fluorocarbon" (column 3, lines 9-11), the need for increasing the amount of reactive fluorine to increase the etching rate (column 3, lines 15-19) and the advantages of a high etching rate, *i.e.* "the cleaning times are short while also being gentle on the materials" (column 3, lines 25-27), Gabric does not expressly disclose $C_3CF{=}CF_2$ (C_3F_6) as the fluorinated carbon cleaning gas.

Yanagida teaches that it is known in the semiconductor art to substitute an unsaturated fluorocarbon, such as hexafluoropropene (C_3F_6), for the well-known etching fluorocarbon gases, for instance C_2F_6, in the removal of silicon oxides due to the higher etch rate of C_3F_6 and reduced amount of etching gas required as a result of the dissociation of the unsaturated bond to form two or more units of CF_x+ from one molecule of the etching gas (column 2, lines 1-4 & lines 40-55), and specifically for superior characteristics such as "high etch rate, high selectivity, low damage, and particularly low pollution" (column 3, lines 20-24).

Sony Corp. also teaches that it is known in the dry etching semiconductor art that unsaturated gases with the basic formula of C_xF_y, where x=2 or more, and y=2x or less, (and preferably $CF_3CF{=}CF_2$), are preferred due to the higher etching rate by dissociation of the unsaturated bond (column 7, line 46 and the abstract).

Therefore, the position is taken that a person of ordinary skill in the art at the time the invention was made would have been motivated to modify the cleaning method of Gabric by substituting a saturated fluorocarbon gas with the unsaturated fluorocarbon gas (namely, $CF_3CF=CF_2$) disclosed by either Yanagida or Sony Corp., in order to provide more efficient cleaning by plasma etching as well as other known characteristics such as lower pollution.

Conclusion

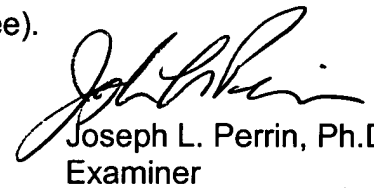
4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

5. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph L. Perrin, Ph.D. whose telephone number is (571)272-1305. The examiner can normally be reached on M-F 7:00-4:30, except alternate Fridays.

7. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael E. Barr can be reached on (571)272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Joseph L. Perrin, Ph.D.
Examiner
Art Unit 1746

jlp